ENGINEERING BULLETIN 510

DUNHAM TYPE L CONCEALED RADIATORS

C. A. DUNHAM CO., LIMITED
1523 DAVENPORT ROAD TORONTO, ONTARIO

A. I. A. FILE NO. 30-C-4

DUNHAM TYPE L CONCEALED RADIATORS

THE ULTIMATE IN ROOM HEATING

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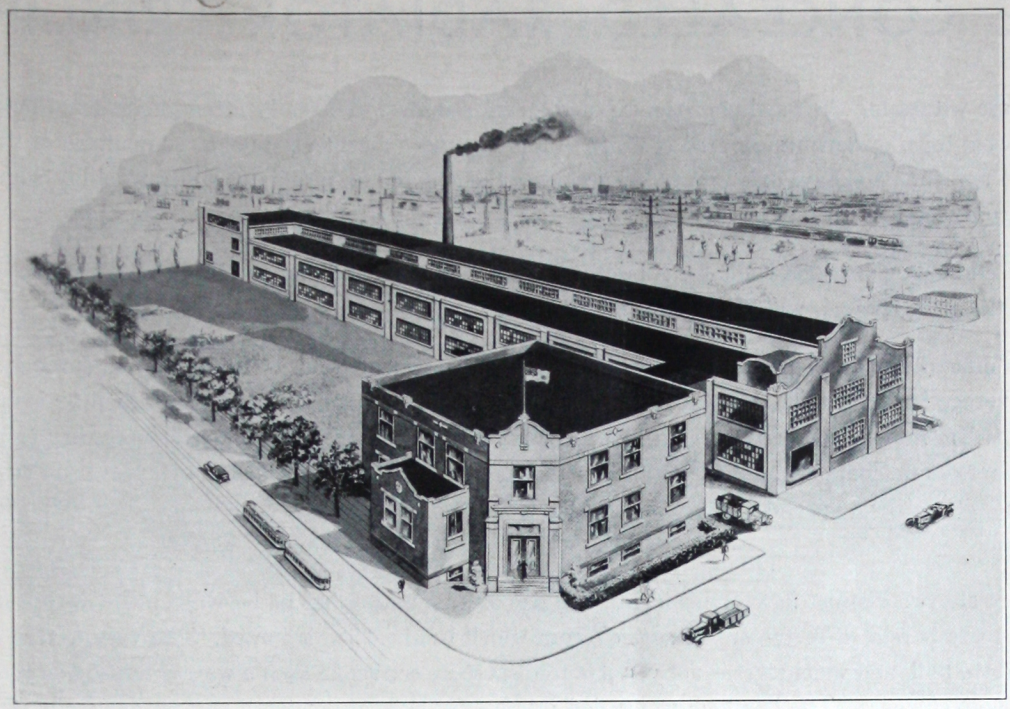

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THE CONCEALED RADIATOR PRINCIPLE

WE are witnessing the passing of the exposed steam radiator. The early attempts at beautification — marble tops, ornamental figured castings — and the more recent attempt at camouflage in the form of covers and cabinets, have only served to emphasize the demand for a radiator which would be completely hidden from view.

The Dunham Concealed Radiator is built into the walls of the building, and makes its presence known only by the grille through which its warmth is diffused.

It is difficult for the layman to visualize a radiator of sufficient capacity in the limited space available in the average building wall. He thinks in terms of the heavy, bulky radiator with which he is familiar. His skepticism may be further increased by experience with covers which he found it necessary to remove when the maximum heat output of the radiator was required. He reasons logically — If a cover on a radiator many times the size you propose will decrease its output, what can I expect from a concealed radiator boxed in the wall?

There are two distinct flaws in his logic. The size of the radiator has no bearing on the work it will do, except as size is related to the actual surface from which the heat is dissipated. The very nature of cast iron tends to bulk and weight. It is not possible to dispose its surface in such a way as to provide the maximum in a given space. The Dunham Concealed Radiator is built of copper, a non-ferrous metal of exceptional ductility, which lends itself to almost any assembly. Although the bulk and weight of the Dunham radiator is many times less, the necessary heating surface is provided.

There is no parallel between the cover on the exposed radiator and the concealed radiator enclosure. The exposed radiator dissipates heat in two ways — by convection and by radiation. The former is the heat which is imparted to the air in contact with the radiator and which increases the air temperature. The latter is the heat in the form of rays which pass through the air without affecting its temperature. The heat carried by these rays is imparted to objects which the rays strike. It is this form of heat dissipation which makes the area in the vicinity of the radiator so uncomfortable. Almost any form of cover will retard the radiant heat output and will usually retard the air flow as well, because the exposed radiator is not designed for this application.

The Dunham radiator is designed to impart all of its heat by convection. The enclosure, therefore, instead of being a detriment, is a necessary part of the assembly because it acts as the flue or chimney which creates the draft essential to the flow of air through the radiator.

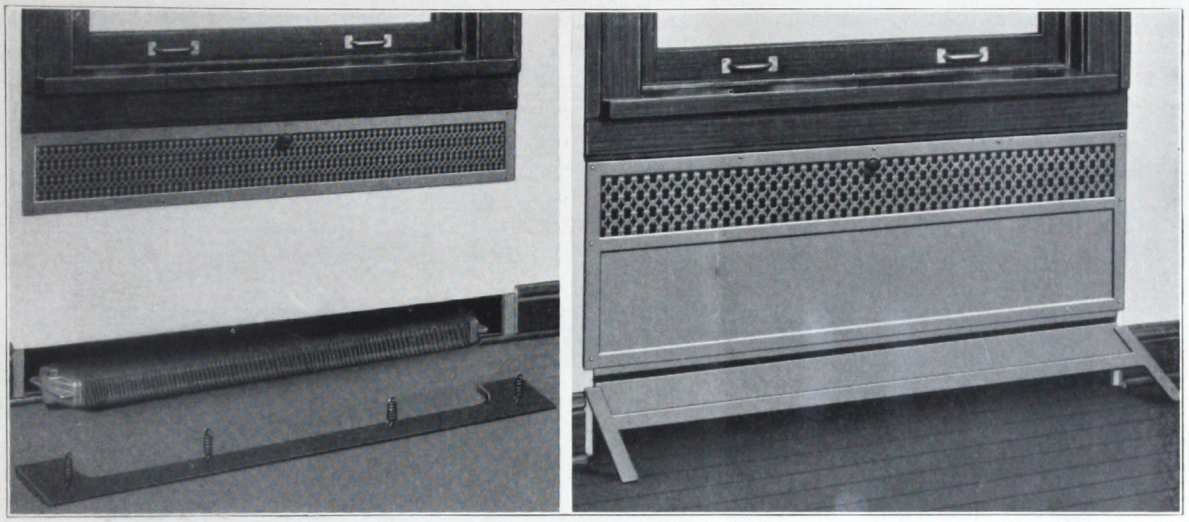
There is a marked difference in the atmosphere of a room heated by the Dunham radiator and one heated in the old-fashioned way. The Dunham radiator creates a steady flow of tempered air which reaches every corner of the room, and the control of heat by means of the damper is simplicity itself. The temperature of the room is uniform and there is no occasion for overheating.

The saving in fuel for which the Dunham radiator is responsible requires some explanation. The heat which is lost from a room is in direct proportion to the difference in temperature between the air in the room and the outdoor air. It follows, therefore, that a temperature at any level in the room in excess of that required for comfort is wasteful. The temperature variation from the floor to the ceiling of a room heated with a Dunham radiator will be much less than that when the exposed radiator is used because the Dunham radiator circulates a greater volume of air at lower temperature.

ACCESSIBILITY

HEATING ELEMENT REMOVABLE

It is difficult to imagine a circumstance which would necessitate the removal of a Dunham heating element from the recess. Regardless of how remote the possibility, there certainly is an advantage in this feature, particularly when it is available at no extra cost. The cuts clearly show how easily the element can be removed from any standard enclosure. The cut at the right illustrates the MP enclosure, and the one at the left shows the removable baseboard section to be used in connection with the RC, PF and TO enclosures. In the event an inlet grille is used in any of the latter types, the element may be removed through the opening in the baseboard covered by the grille. (See page 25.)



CONSTRUCTION OF REMOVABLE BASEBOARD SECTION

The removable section of baseboard should be cut out of the length of board to be used at that particular point, using a fine saw in order that the grain of the wood will match. The section should be of the length indicated on the enclosure dimension drawings, or the length from center to center of the recess framing. The cut-out for the air inlet opening should be four inches high, and approximately three inches shorter than the nominal length of the radiator.

An obvious method of applying a removable baseboard section is to fasten it to the wood framing by wood screws, removing the screws whenever it is necessary to obtain free access to the heating element, to the valve, trap or adjustable regulating fitting for cleaning or adjustment. Screws, however, have always been a nuisance, and wood screws particularly, after having been removed once or twice, will slip and fail to hold.

No tools are required to remove the baseboard section with the Dunham method of attachment. We are prepared to furnish for each Dunham Concealed Radiator a set of hooks and special springs which are to be used in holding the baseboard section in place. The springs, stretched from one row of hooks fastened to the back of the recess to another row attached to the back of the baseboard, are in enough tension to prevent the warping of the loose section. When the removal of the board is necessary, the springs are unhooked at one or both ends, and the baseboard will slide up out of the groove formed by the extension of the quarter-round, and the additional quarter-round behind the baseboard. The photograph above, showing the heating element being removed from an enclosure fitted with a removable baseboard section, illustrates very clearly the use of the hooks and springs.

THE HEATING ELEMENT

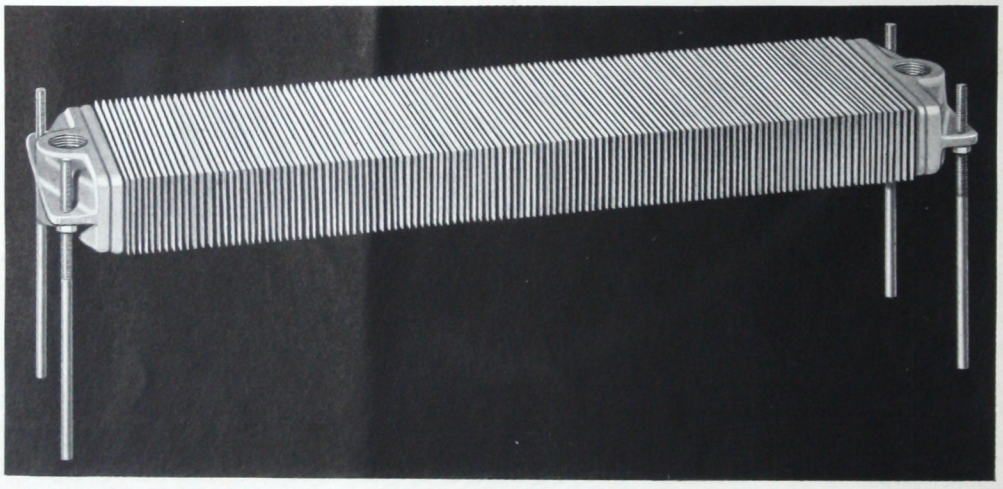
DURABLE

The heating element of the Dunham Concealed Radiator is primarily a durable assembly. It is constructed entirely of non-corrosive materials — copper tubes and fins, and bronze castings. Under the strenuous service of a steam heating system, copper alone, of all the common metals, is corrosion-proof.

PERMANENT HEATING CAPACITY

The Dunham heating element assures permanent heating capacity. Each of the various parts is so carefully attached to the others that the entire assembly forms an integral unit. The copper fins are die-pressed with an accurately formed collar, into which the tubes are pressed, forming an exceedingly tight joint. However, this pressed joint in itself is not considered sufficient, for no mechanical joint, however tight it may be, can exclude the oxidation of the metals, nor prevent a slight accumulation of dust and dirt, which will, in time, insulate the two pieces. After the tubes have been pressed into the fins, the entire assembly is coated with a layer of solder, effectually closing any opening which might be present, and assuring the constant, uniform transfer of heat over a lifetime of service.

The importance of this feature will be realized when it is considered that a majority of the heating surface in the modern heating element is in the fins, and if these become ineffectual due to the insulating



qualities of oxidation, dust and dirt, materials which can be excluded, the value of the unit for heating has disappeared. When the transfer of heat from the tubes to the fins has stopped, very little heat will be imparted to the air.

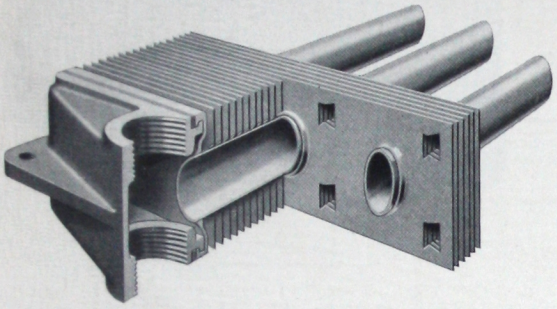
HIGHLY CONDUCTIVE

For the most efficient use of the space occupied, exhaustive tests have shown that the combination of fins and tubes as presented in the Dunham Concealed Radiator is the best possible. In order to accomplish this, the material used must be highly conductive. Copper is the most active of all the metals used for radiator manufacture from this point of view. Since practically no heat is derived from a concealed radiator by radiation, the importance of a material with a high rate of conduction can be realized. Per cubic inch of space occupied, more heat is available with the Dunham Concealed Radiator than with any other type of heat-transferring element.

FOR LIFETIME SERVICE

CONSTRUCTION

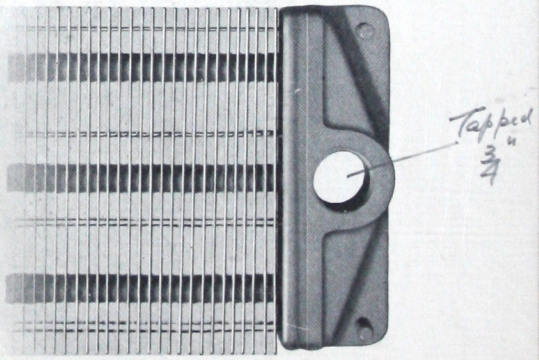
The construction of the heating element forms a very interesting study. The method of attaching fins to tubes has already been explained. The tubes are of seamless drawn copper streamlined to present little or no restriction to the flow of air, and yet to furnish the proper amount of steam carrying space. At each end, the tubes are fastened into heavy copper header sheets which are die-pressed into a form which will permit expansion and contraction without strains on the tubes or joints. These joints are made first by pressing the tube into a collar on the sheet, and then securely brazing the joint. The header sheets are formed over one-piece bronze castings, the edges rolled into a groove, and then tightly brazed in place.



Each assembly is tested to a hydrostatic pressure of one hundred pounds per square inch, and must be tight at that pressure to be accepted. Occasionally, standard elements are taken out of the assembly line, and subjected to a breakdown test, rupture occurring at pressures exceeding five hundred pounds per square inch.

It will be noted from the illustration that the fins are straight and smooth, and separated by large spaces. Thus there is not the slightest tendency to collect dirt and dust on the fins, making what is practically a self-cleaning radiator.

The value of the streamlined tubes can also be realized from this illustration. The internal area of these tubes is approximately equal to that of three ¾-inch round tubes, which, if placed in the same radiator, would materially decrease the free area, thereby impeding the air flow.



LEGS

A set of four legs is packed in the carton with every Dunham heating element. These legs are intended primarily for the support of the element while the steamfitter takes the measurements necessary for accurate piping connections. After the measurements are made, and the connections are ready, the legs may be removed and discarded or left in place, as desired. The light weight of the element makes it unnecessary for any support other than that available with the piping itself.

THE ADJUSTABLE

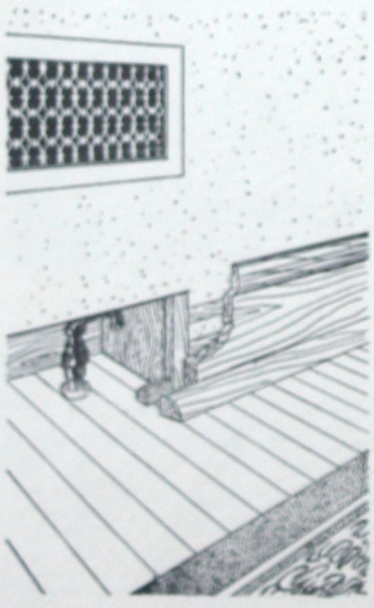
THE Dunham adjustable regulating fitting is a device which makes it possible to accurately apportion the supply of steam to every Dunham Concealed Radiator.

Some means of regulating the flow of steam to every radiator is a necessary part of the modern steam heating system. Without regulation, steam follows the path of least resistance and quickly fills the smaller radiators and those nearest the source of steam supply, while the larger radiators and those remote from the source are inadequately supplied.

Fixed regulating plates — sometimes called orifice plates — are well suited for use in standard exposed radiators, because they can be properly located in the valve or exposed piping and are accessible.

Regulating plates *must* be accessible. We know from experience that fixed regulating plates should not be installed until the sediment, which is present in every new heating system, has been flushed out. Sediment is certain to collect in the port of a regulating plate (many of which are less than 1/8 inch diameter) if the plate is installed when the system is new. Furthermore, it is sometimes necessary to change the regulating plate in order to increase or decrease the steam supply to one or more radiators.

The only accessible location for a regulating plate in the piping to a concealed radiator, is in the air inlet space, below the radiator. This location is not suitable, however, because objectionable noise is certain to result. The velocity of steam through the small port in a regulating plate thus located will prevent the water of condensation from draining back through the port. Water will therefore remain in the piping between the regulating plate and the radiator. The result is a mild form of water-hammer.



The regulating fitting is quickly and easily reached through the air inlet opening (with baseboard section removed).

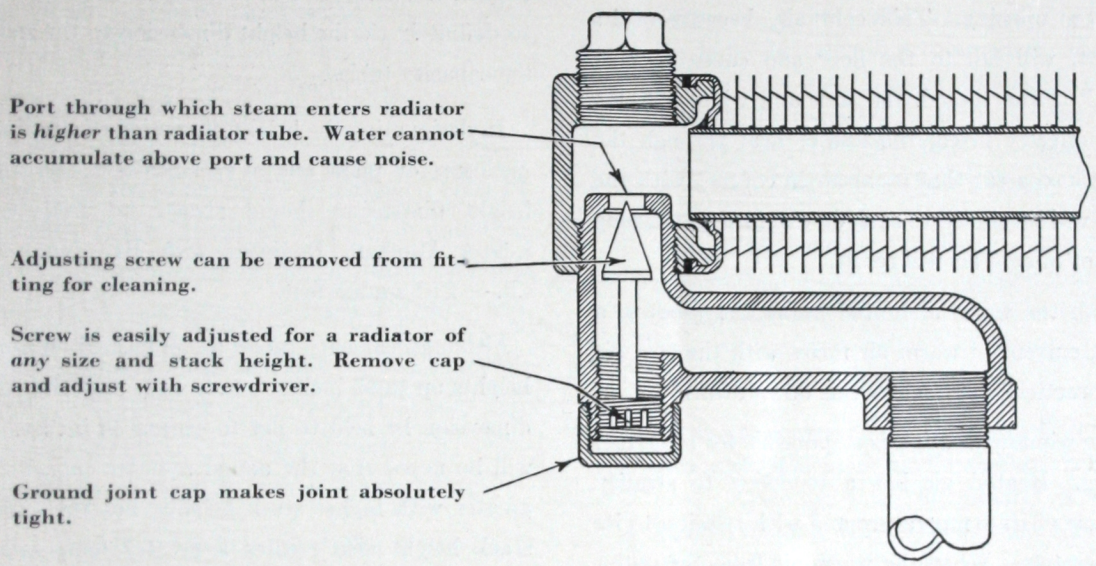
The problem of applying orifice regulation to the concealed radiator is further complicated by the almost unlimited range of capacities occasioned by variations in stack height. It will be noted in the capacity tables that for the stack heights listed there is a variation of over 50 per cent in radiators of the same size.

The Dunham Adjustable Regulating Fitting can be adjusted for a radiator of any size and any stack height.

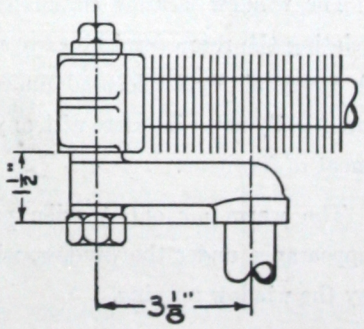
REGULATING FITTING

THE diagram below clearly shows that the Dunham adjustable regulating fitting is a complete solution of the problem. The fitting is made entirely of brass, accurately machined.

A tag is attached to each fitting showing the proper adjustment for a radiator of any capacity. All that is necessary is to open the screw the specified number of turns.



The regulating fitting serves an added purpose when a supply valve is not installed on the radiator. The adjusting screw can be used as a valve to close the steam supply when the trap is being cleaned or inspected.



We recommend the use of a regulating fitting on every radiator, even though it may not be considered an essential part of some steam circulating systems. Regardless of the type of steam circulating system used, the regulating fitting is a very desirable accessory. It provides a simple means of obtaining radiator balance which is an asset on any heating system and which can hardly be obtained in any other way.

A change in building partitions will sometimes necessitate a change in the heat supply, which in many instances can be accomplished by adjusting the regulating fitting.

The fitting is not a part of the radiator, and is furnished only when ordered and at additional cost.

RADIATOR LOCATION

If possible, radiators should be located in an outside wall, under a window. There are several good reasons for selecting this location.

Practically all of the outdoor air which filters into the room comes in through cracks in the window opening. This cold air, because of its weight, will fall to the floor and cause a "cold floor." Even though the sash and window frame are perfectly fitted, the loss of heat through the glass is so great that room air in contact with the glass will be chilled to such an extent that a falling current of cold air will result.

With the warm air outlet under the window, a rising current of warm air mixes with the cold air and practically eliminates this down draft.

The window location is responsible for some fuel saving. Heated air has a tendency to stratify because of its temperature and with relation to its temperature. When the warm air from the outlet under the window mixes with the cold air from the window, the resultant temperature from the mixture is lower and the temperature difference between the floor and the ceiling will be lower.

The window location eliminates the problem of relating the room furnishings to radiator location. A warm air outlet located under a window will practically never interfere with any desired arrangement of furniture.

The warm air outlet grille presents a better appearance under the window, where it is framed by the window opening.

STACK HEIGHT

It will be noted that height dimensions of enclosures in the tables are based on what is termed "stack height." Stack height is the distance from the bottom of the heating element to the top of the warm air outlet. The relation between stack heights and other height dimensions of the several types of enclosure is not the same. Inasmuch as the radiator capacity is materially influenced by the stack height, this dimension is used as the basis in order to definitely tie the height dimension to the radiator capacity tables.

In designating the height dimension of a radiator enclosure on plans and in specifications, the stack height dimension should always be used; e.g., L-36-A Dunham Radiator with RC enc.—20″ s.h. — 27.1 square feet.

Although capacity tables are published for stack heights up to 65 inches, we strongly urge that this dimension be held to not to exceed 30 inches. It will be noted that the actual radiator capacity is greater with higher stack heights, but the higher stack height also creates a greater temperature difference from floor to ceiling, and is therefore not as efficient.

If the nature of the room is such that a stack height greater than 30 inches is necessary, we recommend that the capacity tables for the 30-inch stack height be used. The additional capacity available by reason of the excess stack height will offset the inefficiency referred to above.

NOMINAL RADIATOR LENGTH

In all dimension tables, measurements of length are based on "nominal radiator length," which is designated by the dimension letter "L." The nominal radiator length is the figure which is a part of the radiator designation; e.g., the nominal radiator length of radiator No. L-36-A is 36 inches.

APPLYING RADIATORS

RADIATOR ENCLOSURES

The selection of the type of enclosure best suited for a particular installation depends upon so many things, such as building construction, nature of occupancy, cost of the system, personal taste, etc., that it would be difficult to make a recommendation for any particular application without a full knowledge of the conditions.

Generally speaking, the plastered front installation, using the type RC, type TO or type PF plaster panel, is preferred for places of residence. The PF enclosure, which is somewhat lower in cost than the RC, is equally as desirable, provided the recess is accurately constructed and made perfectly tight.

As a general rule, the cost of the complete installation is lower with the MP panel type enclosure because of the saving effected by omitting the plaster panel in front of the enclosure.

It will be found that the several available types of standard radiator enclosures, as described in the following pages, will meet practically every requirement. Occasionally, it will be found necessary to design special enclosures for some particular installation. Our Engineering Department will gladly cooperate in their design.

RADIATOR RECESS DESIGN

The dimensions of the recess for a heating element of a given size depend upon the type of enclosure selected. Recess dimensions, therefore, must be taken from the drawings showing the particular type of enclosure which is to be used.

It is obvious that it is not possible in these pages to publish drawings for every type of construction. Recess details for any building construction will be furnished on request.

USING THE CAPACITY TABLES

The following notes indicate, briefly, the steps to be taken in selecting radiator sizes.

1. Determine the radiator capacity required for the room in the usual way, as expressed in square feet of direct radiation.

2. Determine which width of concealed radiator the building wall will accommodate, keeping in mind that there is a slight variation in the recess depth requirement for the several types of enclosure. In some types of building construction, more space is available than is necessary. A window opening is sometimes flanked by columns, leaving a recess depth greater than the maximum radiator width. If there is a choice between a short, wide radiator, and a narrow radiator of greater length, the latter should be selected.

3. Read the paragraph on "Radiator Location" and select a location for the radiator in question. Assuming that the radiator is to be located under a window, determine the available stack height. The relation between stack height and overall height is a fixed dimension for each type of enclosure, and is given in the enclosure dimension tables.

4. Refer to the capacity tables for the radiator width which has been selected, using the table for "front outlet" or "top outlet," whichever applies. Follow down the column for the stack height to be used, selecting a radiator which is equal to, or next greater than, the capacity required.

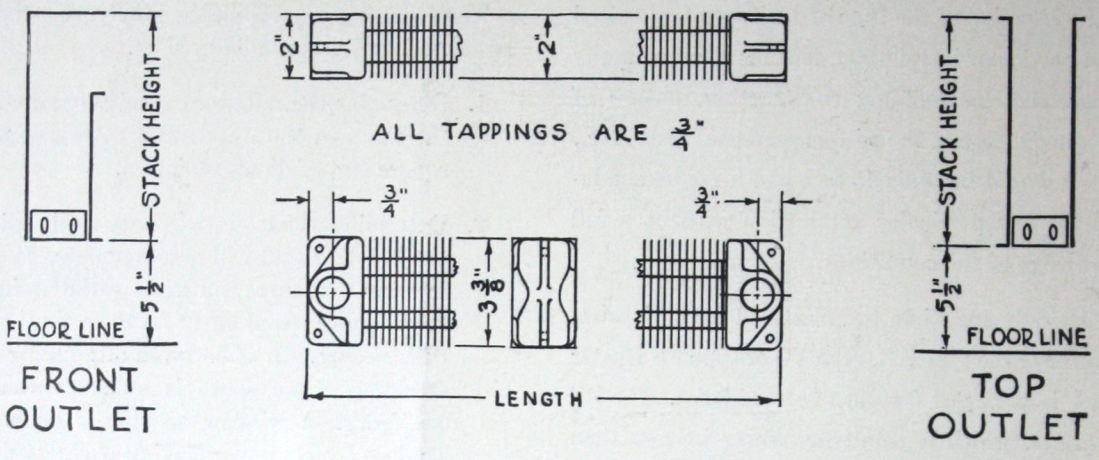
5. If the length of the radiator selected is greater than the available length in the location selected, several alternatives are possible:

   Another location of greater length may be available.

   Two radiators can be used instead of one.

   The recess can be furred out to accommodate a radiator of greater width.

DIMENSIONS AND CAPACITIES
"A" WIDTH 3⅜-INCH TYPE "L"
DUNHAM CONCEALED RADIATORS



WITH FRONT OUTLET GRILLE

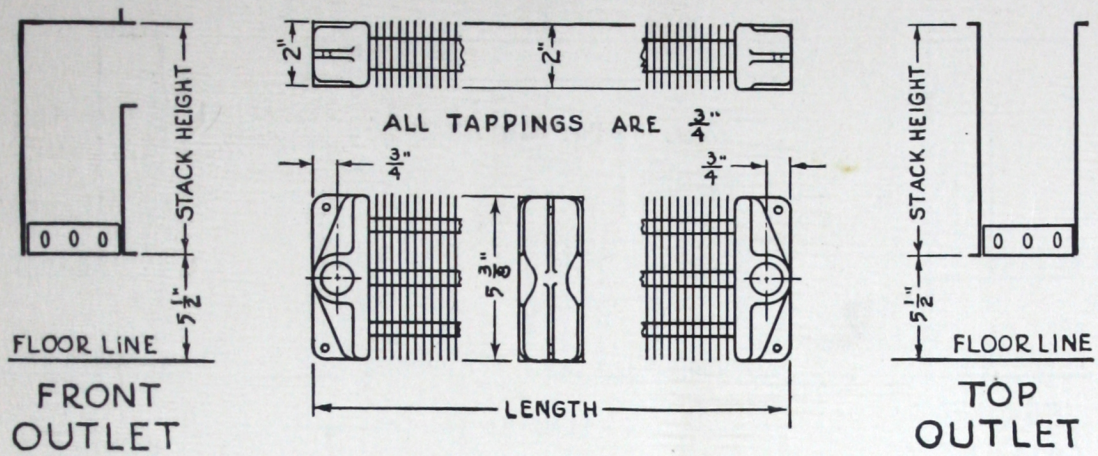
Radiator Designation	Nominal Length Inches	Actual Length Inches	STACK HEIGHT IN INCHES															
			12	14	16	18	20	22	24	26	28	30	35	40	45	50	55	60	65
L-18-A	18	17½	10.2	10.8	11.2	11.6	12.0	12.3	12.6	12.8	13.1	13.3	13.8	14.2	14.6	14.9	15.2	15.5	15.8
L-24-A	24	23½	14.5	15.3	16.0	16.5	17.0	17.5	17.9	18.2	18.6	18.9	19.6	20.2	20.8	21.2	21.7	22.1	22.5
L-30-A	30	29½	18.8	19.8	20.7	21.4	22.1	22.6	23.2	23.6	24.1	24.5	25.4	26.2	26.9	27.5	28.1	28.7	29.1
L-36-A	36	35½	23.1	24.3	25.4	26.3	27.1	27.8	28.5	29.0	29.5	30.1	31.2	32.1	33.0	33.8	34.5	35.2	35.8
L-42-A	42	41½	27.4	28.8	30.1	31.2	32.2	33.0	33.8	34.4	35.0	35.7	37.0	38.1	39.2	40.1	40.9	41.8	42.4
L-48-A	48	47½	31.6	33.3	34.8	36.0	37.2	38.1	39.0	39.8	40.5	41.2	42.8	44.0	45.3	46.4	47.3	48.3	49.0
L-54-A	54	53½	35.9	37.9	39.6	40.9	42.2	43.3	44.3	45.2	46.0	46.8	48.6	50.0	51.4	52.7	53.7	54.8	55.6
L-60-A	60	59½	40.2	42.4	44.3	45.8	47.2	48.5	49.6	50.6	51.5	52.4	54.4	56.0	57.5	59.0	60.2	61.3	62.2

WITH TOP OUTLET GRILLE

Radiator Designation	Nominal Length Inches	Actual Length Inches	STACK HEIGHT IN INCHES																
			8	10	12	14	16	18	20	22	24	26	28	30	35	40	45	50	55
L-18-A	18	17½	10.8	11.2	11.6	12.0	12.3	12.6	12.8	13.1	13.3	13.5	13.7	13.9	14.3	14.7	15.0	15.3	15.6
L-24-A	24	23½	15.3	16.0	16.5	17.0	17.5	17.9	18.2	18.6	18.9	19.2	19.5	19.7	20.3	20.8	21.3	21.8	22.2
L-30-A	30	29½	19.8	20.7	21.4	22.1	22.6	23.2	23.6	24.1	24.5	24.9	25.2	25.6	26.3	27.0	27.6	28.2	28.8
L-36-A	36	35½	24.3	25.4	26.3	27.1	27.8	28.5	29.0	29.5	30.1	30.6	31.0	31.4	32.3	33.2	33.9	34.7	35.3
L-42-A	42	41½	28.8	30.1	31.2	32.2	33.0	33.8	34.4	35.0	35.7	36.2	36.7	37.2	38.3	39.4	40.2	41.1	41.9
L-48-A	48	47½	33.3	34.8	36.0	37.2	38.1	39.0	39.8	40.5	41.2	41.8	42.4	43.0	44.3	45.5	46.5	47.5	48.4
L-54-A	54	53½	37.9	39.6	40.9	42.2	43.3	44.3	45.2	46.0	46.8	47.5	48.1	48.8	50.3	51.6	52.8	54.0	54.9
L-60-A	60	59½	42.4	44.3	45.8	47.2	48.5	49.6	50.6	51.5	52.4	53.2	53.9	54.6	56.3	57.8	59.1	60.5	61.5

Capacities are given in square feet of equivalent direct radiation — based on condensation test results. One square foot equals 240 B.T.U./Hr.
Capacities with top outlet grille are those available when outlet grille is located in window sill. Ratings allow for resistance caused by downdraft from window.

DIMENSIONS AND CAPACITIES
"B" WIDTH 5⅜-INCH TYPE "L"
DUNHAM CONCEALED RADIATORS



WITH FRONT OUTLET GRILLE

Radiator Designation	Nominal Length Inches	Actual Length Inches	STACK HEIGHT IN INCHES															
			12	14	16	18	20	22	24	26	28	30	35	40	45	50	55	60	65
L-18-B	18	17½	14.2	15.1	15.6	16.3	16.8	17.2	17.6	17.9	18.3	18.6	19.3	19.9	20.5	20.9	21.3	21.7	22.0
L-24-B	24	23½	20.2	21.4	22.2	23.1	23.8	24.4	25.0	25.5	25.9	26.4	27.4	28.2	29.0	29.7	30.3	30.8	31.3
L-30-B	30	29½	26.2	27.7	28.8	30.0	30.9	31.7	32.4	33.0	33.6	34.2	35.5	36.6	37.6	38.5	39.3	40.0	40.6
L-36-B	36	35½	32.2	34.0	35.4	36.9	37.9	38.9	39.8	40.6	41.3	42.0	43.6	44.9	46.1	47.3	48.2	49.2	49.9
L-42-B	42	41½	38.2	40.3	42.0	43.7	45.0	46.1	47.2	48.1	49.0	49.8	51.7	53.3	54.6	56.0	57.2	58.3	59.2
L-48-B	48	47½	44.2	46.6	48.6	50.6	52.0	53.3	54.6	55.7	56.6	57.6	59.8	61.8	63.2	64.8	66.1	67.5	68.5
L-54-B	54	53½	50.2	52.9	55.2	57.5	59.0	60.5	62.0	63.2	64.3	65.4	67.9	69.1	71.7	73.6	75.1	76.6	77.8
L-60-B	60	59½	56.2	59.2	61.8	64.4	66.0	67.8	69.3	70.8	72.0	73.1	76.0	78.2	80.3	82.4	84.1	85.7	87.1

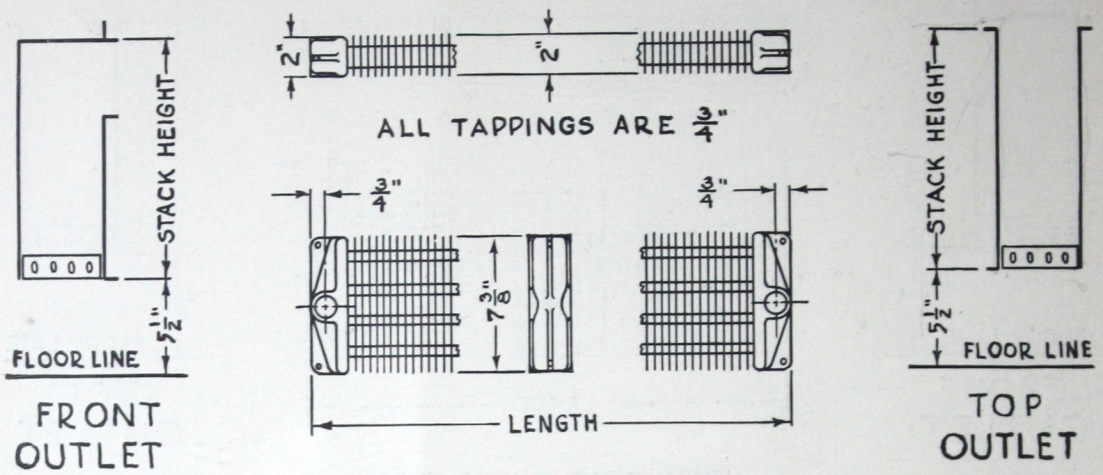
WITH TOP OUTLET GRILLE

Radiator Designation	Nominal Length Inches	Actual Length Inches	STACK HEIGHT IN INCHES															
			8	10	12	14	16	18	20	22	24	26	28	30	35	40	45	50	55
L-18-B	18	17½	15.1	15.6	16.3	16.8	17.2	17.6	17.9	18.3	18.6	18.8	19.0	19.3	19.9	20.4	20.9	21.4	21.8
L-24-B	24	23½	21.4	22.2	23.1	23.8	24.4	25.0	25.5	25.9	26.4	26.7	27.1	27.5	28.3	29.0	29.7	30.4	31.0
L-30-B	30	29½	27.7	28.8	30.0	30.9	31.7	32.4	33.0	33.6	34.2	34.7	35.1	35.6	36.7	37.7	38.5	39.4	40.1
L-36-B	36	35½	34.0	35.4	36.9	37.9	38.9	39.8	40.6	41.3	42.0	42.6	43.2	43.8	45.1	46.3	47.4	48.5	49.3
L-42-B	42	41½	40.3	42.0	43.7	45.0	46.1	47.2	48.1	49.0	49.8	50.6	51.2	51.9	53.5	55.0	56.2	57.5	58.5
L-48-B	48	47½	46.6	48.6	50.6	52.0	53.3	54.6	55.7	56.6	57.6	58.5	59.3	60.1	61.9	63.6	65.0	66.5	67.6
L-54-B	54	53½	52.9	55.2	57.5	59.0	60.5	62.0	63.2	64.3	65.4	66.5	67.3	68.2	70.3	72.6	73.8	75.5	76.8
L-60-B	60	59½	59.2	61.8	64.4	66.0	67.8	69.3	70.8	72.0	73.1	74.4	75.4	76.3	78.7	80.9	82.6	84.5	86.0

Capacities are given in square feet of equivalent direct radiation — based on condensation test results. One square foot equals 240 B.T.U./Hr.
Capacities with top outlet grille are those available when outlet grille is located in window sill. Ratings allow for resistance caused by downdraft from window.

F 8

DIMENSIONS AND CAPACITIES
"C" WIDTH 7⅜-INCH TYPE "L"
DUNHAM CONCEALED RADIATORS



WITH FRONT OUTLET GRILLE

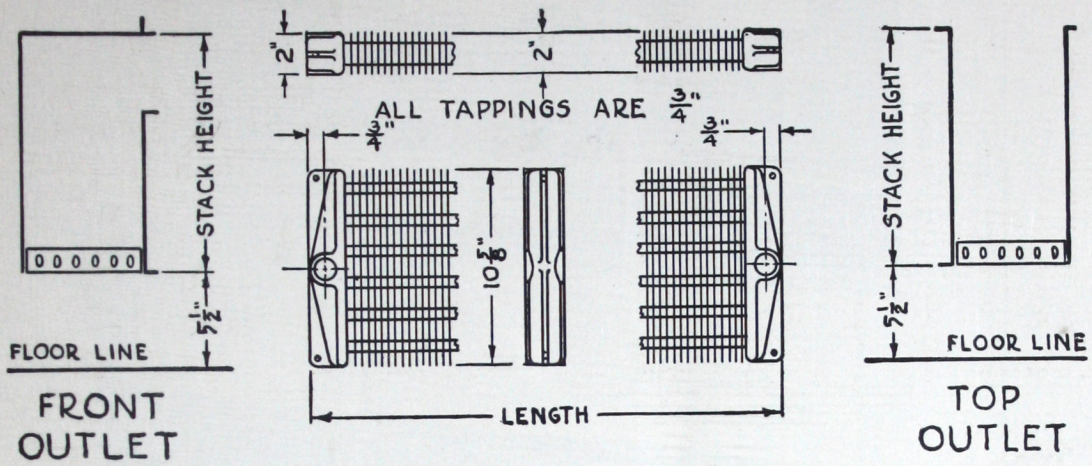
Radiator Designation	Nominal Length Inches	Actual Length Inches	STACK HEIGHT IN INCHES															
			12	14	16	18	20	22	24	26	28	30	35	40	45	50	55	60	65
L-18-C	18	17½	17.8	18.8	19.6	20.3	20.9	21.5	21.9	22.4	22.8	23.2	24.2	24.8	25.5	26.1	26.7	27.1	27.6
L-24-C	24	23½	25.3	26.7	27.9	28.8	29.7	30.6	31.2	31.8	32.4	33.0	34.3	35.2	36.2	37.1	37.9	38.5	39.2
L-30-C	30	29½	32.8	34.6	36.1	37.3	38.5	39.6	40.4	41.2	42.0	42.7	44.4	45.6	46.9	48.1	49.1	49.9	50.8
L-36-C	36	35½	40.3	42.5	44.4	45.9	47.3	48.6	49.6	50.7	51.6	52.5	54.6	56.0	57.6	59.1	60.3	61.4	62.5
L-42-C	42	41½	47.8	50.4	52.6	54.4	56.1	57.6	58.9	60.1	61.2	62.2	64.7	66.4	68.3	70.1	71.5	72.8	74.1
L-48-C	48	47½	55.3	58.3	60.9	62.9	64.9	66.6	68.1	69.5	70.8	72.0	74.8	76.8	79.0	81.0	82.7	84.2	85.7
L-54-C	54	53½	62.8	66.2	69.1	71.5	73.7	75.6	77.3	79.0	80.4	81.8	84.9	87.2	89.6	92.0	93.9	95.6	97.3
L-60-C	60	59½	70.3	74.1	77.3	80.0	82.5	84.7	86.6	88.4	90.0	91.5	95.0	97.6	100.3	103.1	105.2	107.0	109.0

WITH TOP OUTLET GRILLE

Radiator Designation	Nominal Length Inches	Actual Length Inches	STACK HEIGHT IN INCHES															
			8	10	12	14	16	18	20	22	24	26	28	30	35	40	45	50	55
L-18-C	18	17½	18.8	19.6	20.3	20.9	21.5	21.9	22.4	22.8	23.2	23.5	23.9	24.2	24.9	25.6	26.2	26.8	27.2
L-24-C	24	23½	26.7	27.9	28.8	29.7	30.6	31.2	31.8	32.4	33.0	33.5	33.9	34.4	35.4	36.4	37.2	38.0	38.7
L-30-C	30	29½	34.6	36.1	37.3	38.5	39.6	40.4	41.2	42.0	42.7	43.4	44.0	44.6	45.9	47.2	48.2	49.3	50.2
L-36-C	36	35½	42.5	44.4	45.9	47.3	48.6	49.6	50.7	51.6	52.5	53.4	54.1	54.8	56.5	58.0	59.3	60.6	61.7
L-42-C	42	41½	50.4	52.6	54.4	56.1	57.6	58.9	60.1	61.2	62.2	63.3	64.2	65.0	67.0	68.8	70.4	71.9	73.2
L-48-C	48	47½	58.3	60.9	62.9	64.9	66.6	68.1	69.5	70.8	72.0	73.2	74.3	75.2	77.5	79.5	81.4	83.2	84.7
L-54-C	54	53½	66.2	69.1	71.5	73.7	75.6	77.3	79.0	80.4	81.8	83.1	84.3	85.4	88.0	90.3	92.4	94.5	96.2
L-60-C	60	59½	74.1	77.3	80.0	82.5	84.7	86.6	88.4	90.0	91.5	93.0	94.4	95.6	98.5	101.1	103.4	105.8	107.7

Capacities are given in square feet of equivalent direct radiation — based on condensation test results. One square foot equals 240 B.T.U./Hr.
Capacities with top outlet grille are those available when outlet grille is located in window sill. Ratings allow for resistance caused by downdraft from window.

DIMENSIONS AND CAPACITIES
"D" WIDTH 10⅝-INCH TYPE "L"
DUNHAM CONCEALED RADIATORS



WITH FRONT OUTLET GRILLE

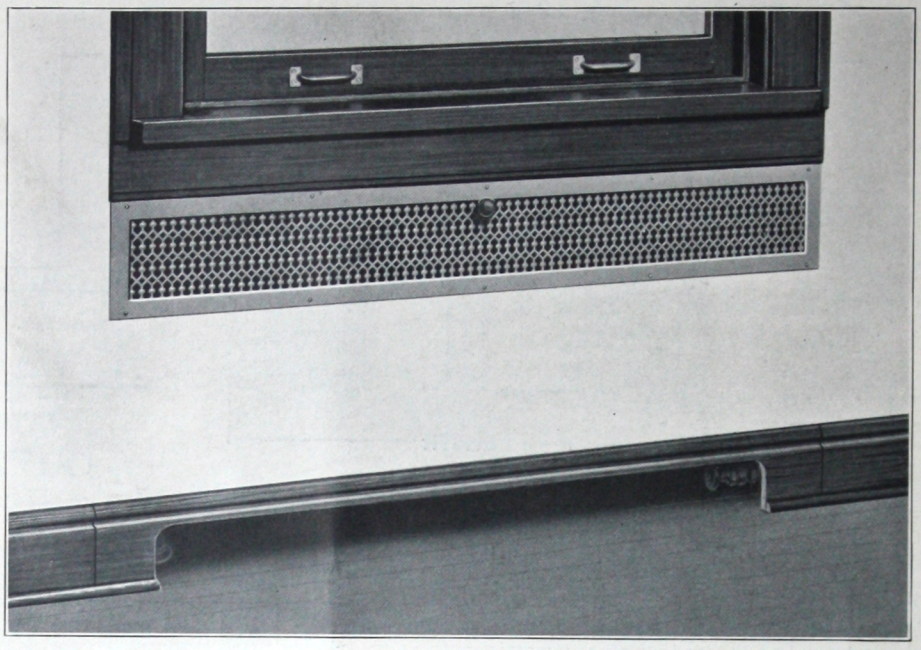
Radiator Designation	Nominal Length Inches	Actual Length Inches	STACK HEIGHT IN INCHES															
			12	14	16	18	20	22	24	26	28	30	35	40	45	50	55	60	65
L-18-D	18	17½	23.2	24.5	25.6	26.5	27.3	28.0	28.6	29.2	29.7	30.2	31.4	32.4	33.2	34.0	34.8	35.4	36.0
L-24-D	24	23½	33.0	34.8	36.4	37.7	38.8	39.8	40.7	41.5	42.2	43.0	44.6	46.1	47.2	48.4	49.4	50.4	51.2
L-30-D	30	29½	42.8	45.2	47.1	48.8	50.3	51.6	52.7	53.8	54.8	55.7	57.9	59.7	61.3	62.8	64.1	65.3	66.3
L-36-D	36	35½	52.6	55.5	57.9	60.0	61.8	63.4	64.8	66.1	67.3	68.5	71.1	73.4	75.3	77.1	78.7	80.3	81.5
L-42-D	42	41½	62.4	65.8	68.7	71.2	73.3	75.2	76.8	78.4	79.9	81.2	84.4	87.0	89.3	91.5	93.4	95.2	96.6
L-48-D	48	47½	72.1	76.1	79.5	82.4	84.8	87.0	88.9	90.7	92.4	94.0	97.6	100.6	103.3	105.9	108.0	110.2	111.8
L-54-D	54	53½	81.9	86.5	90.2	93.5	96.3	98.8	100.9	102.9	104.9	106.7	110.8	114.2	117.3	120.2	122.7	125.1	127.0
L-60-D	60	59½	91.7	96.8	101.0	104.7	107.8	110.6	113.0	115.1	117.4	119.4	124.0	128.0	131.3	134.6	137.3	140.0	142.2

WITH TOP OUTLET GRILLE

Radiator Designation	Nominal Length Inches	Actual Length Inches	STACK HEIGHT IN INCHES															
			8	10	12	14	16	18	20	22	24	26	28	30	35	40	45	50	55
L-18-D	18	17½	24.5	25.6	26.5	27.3	28.0	28.6	29.2	29.7	30.2	30.8	31.2	31.6	32.5	33.4	34.2	34.9	35.5
L-24-D	24	23½	34.8	36.4	37.7	38.8	39.8	40.7	41.5	42.2	43.0	43.7	44.3	45.0	46.2	47.5	48.5	49.6	50.5
L-30-D	30	29½	45.2	47.1	48.8	50.3	51.6	52.7	53.8	54.8	55.7	56.6	57.5	58.3	59.9	61.6	62.9	64.3	65.5
L-36-D	36	35½	55.5	57.9	60.0	61.8	63.4	64.8	66.1	67.3	68.5	69.6	70.6	71.6	73.6	75.6	77.3	79.0	80.5
L-42-D	42	41½	65.8	68.7	71.2	73.3	75.2	76.8	78.4	79.9	81.2	82.5	83.8	85.0	87.4	89.7	91.6	93.7	95.5
L-48-D	48	47½	76.1	79.5	82.4	84.8	87.0	88.9	90.7	92.4	94.0	95.5	96.9	98.3	101.1	103.8	106.0	108.3	110.5
L-54-D	54	53½	86.5	90.2	93.5	96.3	98.8	100.9	102.9	104.9	106.7	108.4	110.0	111.6	114.8	117.9	120.4	123.0	125.5
L-60-D	60	59½	96.8	101.0	104.7	107.8	110.6	113.0	115.1	117.4	119.4	121.4	123.1	124.9	128.5	132.0	134.9	137.9	140.5

Capacities are given in square feet of equivalent direct radiation — based on condensation test results. One square foot equals 240 B.T.U./Hr.
Capacities with top outlet grille are those available when outlet grille is located in window sill. Ratings allow for resistance caused by downdraft from window.

COMPLETE RECESSED CASING ENCLOSURE
TYPE RC



THE type RC enclosure is novel in many ways. The sheet metal casing which is built into the recess extends only to the bottom of the heating element, which is usually 5½ inches above the finished floor. This leaves more space in which to make steam connections and materially reduces the installation cost.

Common practice in the past has been to supply casings which rest on the floor. This usually made it necessary to locate steam supply stubs with relation to holes for the piping in the casing. This has always been a source of annoyance and every steamfitter will appreciate the RC design which eliminates this difficulty.

The RC casing is supported entirely by the screws which hold the casing to the building studs or the wood grounds provided for the purpose in a masonry wall.

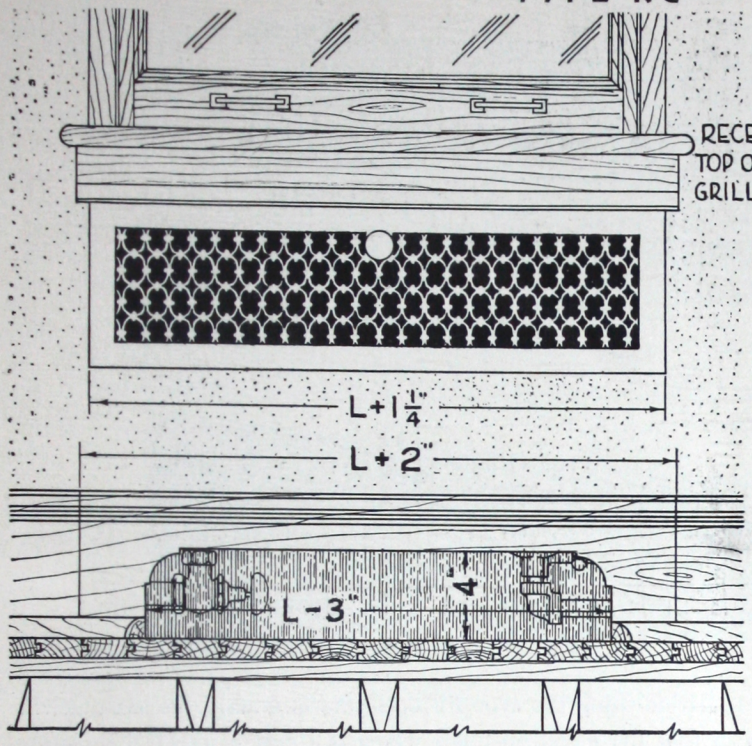
The casing is made of heavy sheet steel painted inside and out with durable enamel. An angle iron frame is welded to the collar on the front panel of the casing to form the air outlet opening. This angle frame is tapped to receive the screws which hold the outlet grille tightly against the frame, the face of which is flush with the finished wall.

The distance from the front of the casing to the face of the angle iron collar is ¾ inch on the standard casing. This is the thickness of ordinary lath and plaster. If the wall construction (such as glazed tile) necessitates a collar length other than ¾ inch, the dimension must be specified on the order.

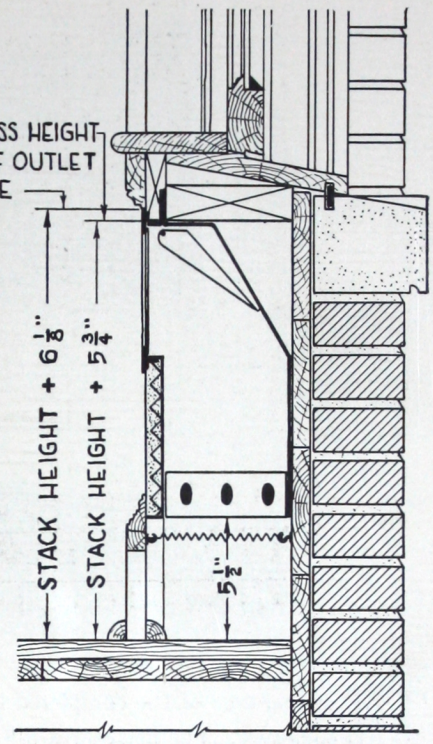
The lip which extends from the lower front edge of the casing and which serves as a plaster stop will always be furnished in the same length as the outlet collar unless otherwise specified.

INSTALLATION DIMENSIONS OF COMPLETE RECESSED CASING ENCLOSURE

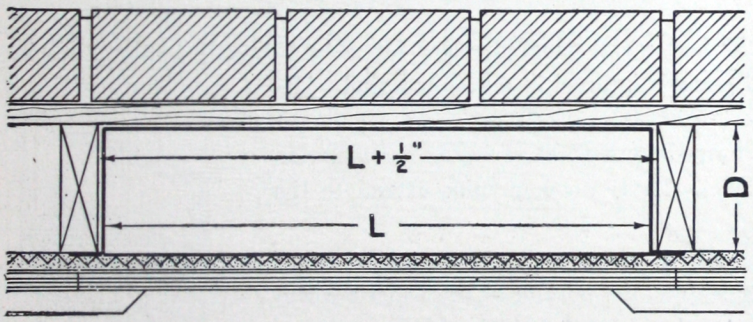
TYPE RC



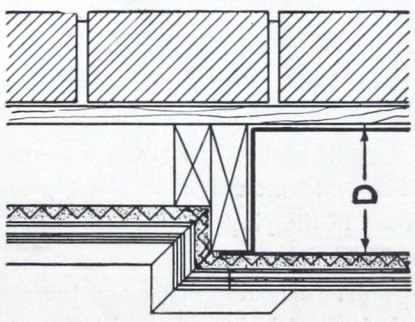
ELEVATION



SECTION



PLAN OF FLUSH RECESS



PART PLAN FURRED RECESS

Dimension "L" is the nominal radiator length, and also the length of the casing. The length of the heating element is ½ inch less than the nominal radiator length in all cases.

Dimension "D," the recess depth, measured from back of plaster to rear of recess, is 3⅝ inches for the "A" width, 5⅝ inches for the "B" width, 7⅝ inches for the "C" width, and 10⅞ inches for the "D" width.

In the following tables, height dimensions are given for standard stock casings. Higher casings are available on special order.

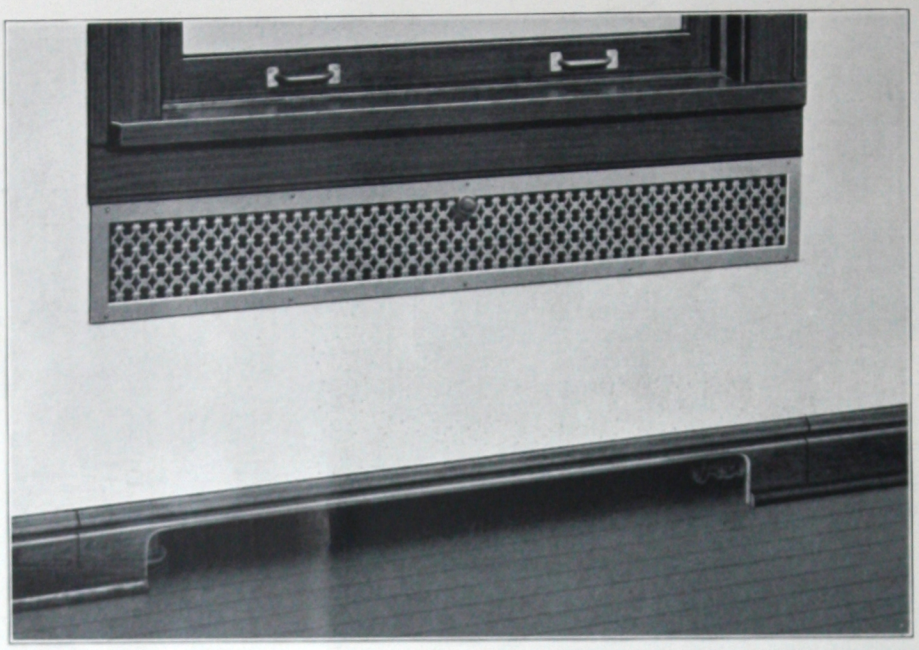
These height dimensions apply when the heating element and the bottom of the casing are located 5½ inches from the finished floor — which is standard.

Stack Heights — Stock Casings	12	14	16	18	20	22	24	26	28	30
Corresponding Heights from Floor to Top of Outlet Grille	18⅛	20⅛	22⅛	24⅛	26⅛	28⅛	30⅛	32⅛	34⅛	36⅛
Corresponding Recess Heights	17¾	19¾	21¾	23¾	25¾	27¾	29¾	31¾	33¾	35¾

Dimensions in above table are in inches.

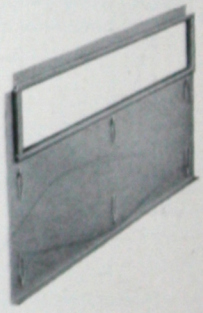
THE PLASTER FRONT ENCLOSURE

TYPE PF



THE appearance of the completed installation using the type PF enclosure is exactly the same as the RC enclosure. The enclosures differ in that the metal liner box which is a part of the RC enclosure is omitted.

The type PF enclosure consists of a sheet metal panel arranged for nailing directly to the studs in frame building construction, or to wood grounds inserted in a masonry wall.



The back of the radiator recess is formed by a sheet of insulating material. The wood grounds form the top and sides. These wood grounds extend to the back of the plaster.

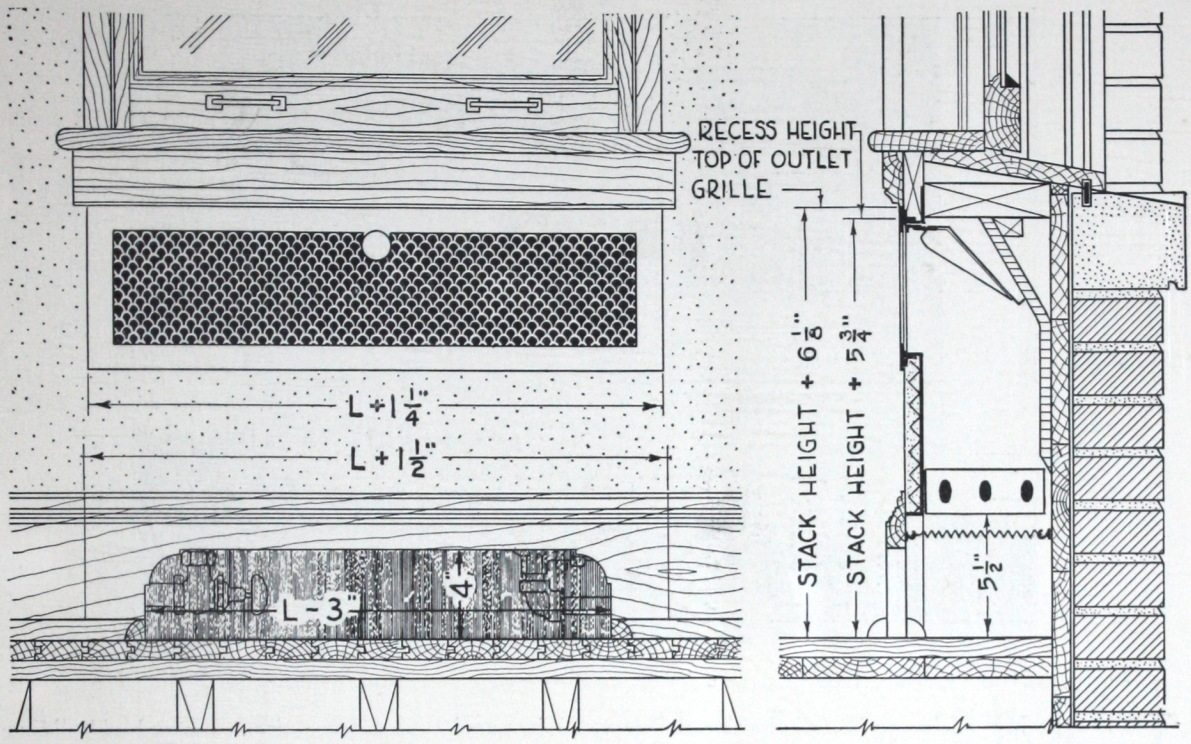
The air outlet collar and the plaster stop at the bottom of the panel are regularly furnished for a metal lath and plaster thickness of ¾ inch. If the wall construction necessitates a length other than ¾ inch it must be specified on the order. Wires are provided on the panel for tying to the metal lath.

The panel does not extend to the floor but rather to the bottom of the heating element, which is usually placed 5½ inches from the floor. The panel is supported entirely by nails, by means of which it is attached to the building construction.

The panel is made of heavy sheet steel and is finished on both sides in durable gray enamel.

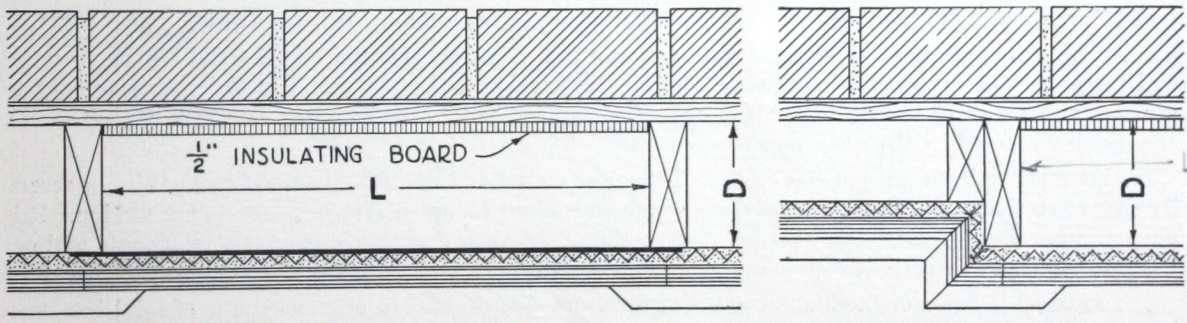
INSTALLATION DIMENSIONS OF PLASTER FRONT ENCLOSURE

TYPE PF



ELEVATION

SECTION



PLAN OF FLUSH RECESS

PART PLAN FURRED RECESS

Dimension "L" is the nominal radiator length, and also the length of the recess.

The length of the heating element is ½ inch less than the nominal radiator length in all cases.

Dimension "D," the recess depth, measured from back of plaster to rear of recess, is 3⅝ inches for the "A" width, 5⅝ inches for the "B" width, 7⅝ inches for the "C" width, and 10⅞ inches for the "D" width.

In the following tables, height dimensions are given for standard stock casings. Higher casings are available on special order.

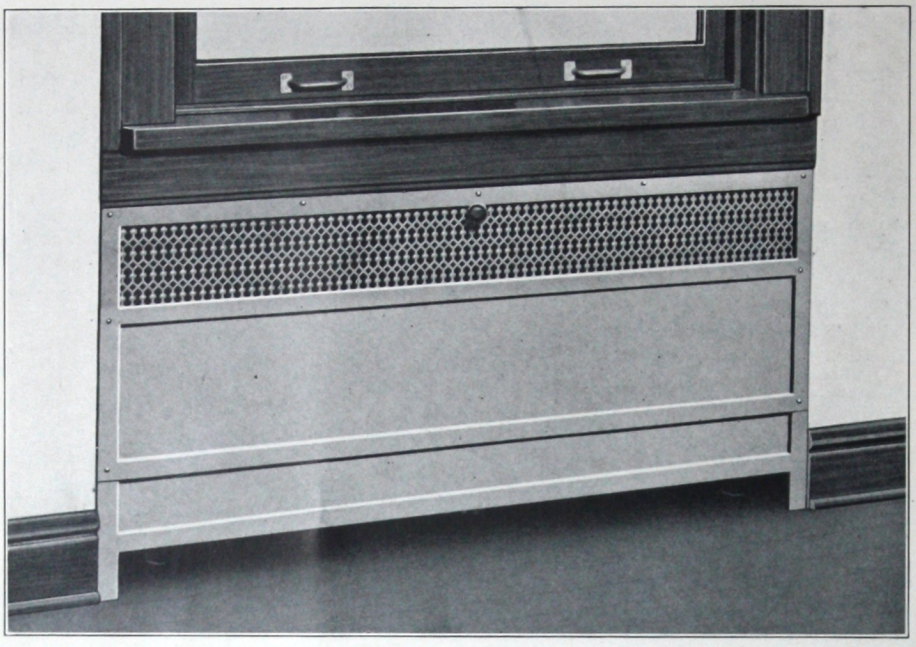
These height dimensions apply when the heating element and the bottom of the casing are located 5½ inches from the finished floor — which is standard.

Stack Heights — Stock Casings	12	14	16	18	20	22	24	26	28	30
Corresponding Heights from Floor to Top of Outlet Grille	18⅛	20⅛	22⅛	24⅛	26⅛	28⅛	30⅛	32⅛	34⅛	36⅛
Corresponding Recess Heights	17¾	19¾	21¾	23¾	25¾	27¾	29¾	31¾	33¾	35¾

Dimensions in above table are in inches.

THE METAL PANEL TYPE ENCLOSURE

TYPE MP



THE type MP enclosure is a distinctive development in panel type construction. Instead of building the metal panel in one piece as has been common practice in the past, the type MP panel is built in two sections, the lower of which extends for a distance of 8 inches from the floor. This is done in order to avoid the necessity of removing the entire panel for access to the radiator, valve and trap.

A serious objection to panel construction in the past has been that the panel could not be removed and replaced without cracking the paint between the panel and the wall. It will never be necessary to remove the main section of the type MP panel. The heating element can be taken out of the recess through the opening covered by the lower panel section.

The construction of the panel is unique. The upper section is screwed to the wood grounds in the recess. The lower section is fitted with a metal lip which slides into a hidden groove in the upper section. It is almost impossible to detect the joint between sections. The lower section is instantly removable without using any tools whatever.

The panel is made of the highest grade of furniture steel welded to a heavy frame of solid bar steel. The panel is available with any of the standard grille patterns (see page 24), and is furnished with or without damper as ordered.

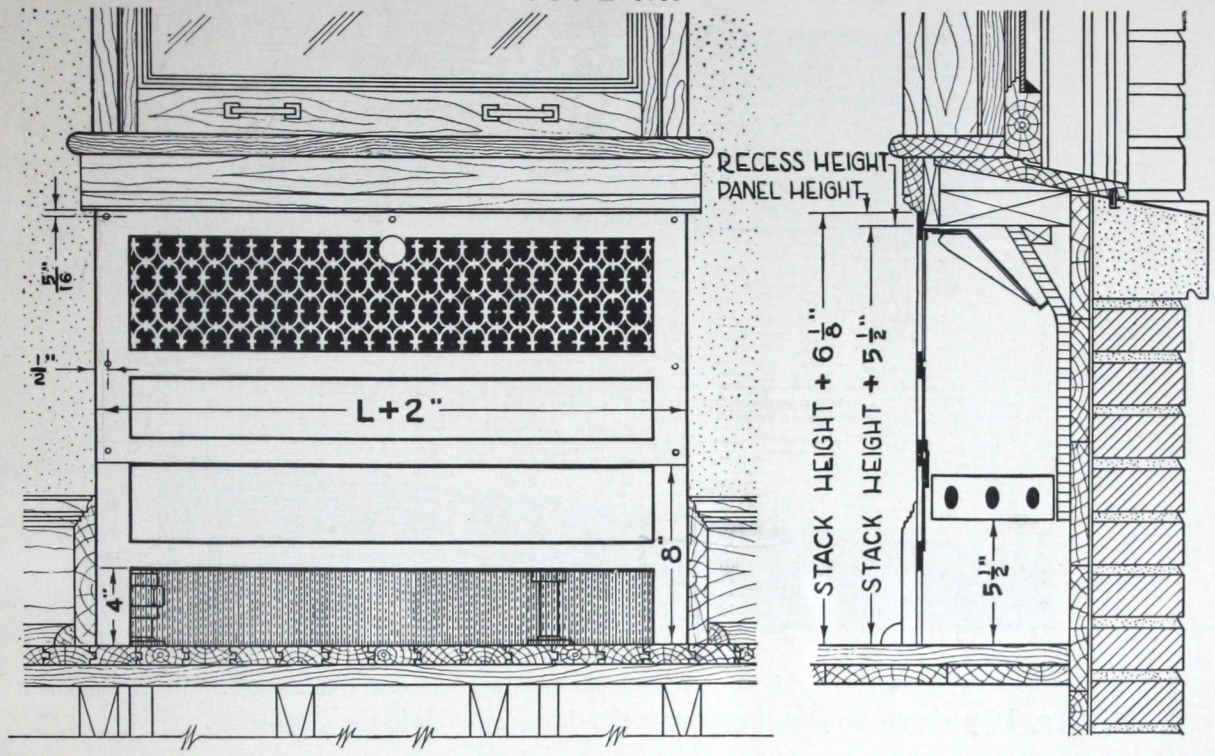
A metal recess lining is not required when the type MP panel is used. The radiator recess is framed in the wall with a sheet of insulating material on the back of the recess. Wood grounds to which the panel is screwed form the sides and top of the recess. These grounds extend to the finished plaster line at the front.

It is not necessary to continue the baseboard across the front of the removable panel, but this can be done if this arrangement is preferred. If the removable baseboard section is to be used in addition to the removable panel, removable baseboard section must be slightly longer than the panel and must be attached to the lower panel section by means of wood screws which hold the panel to the back side of the baseboard.

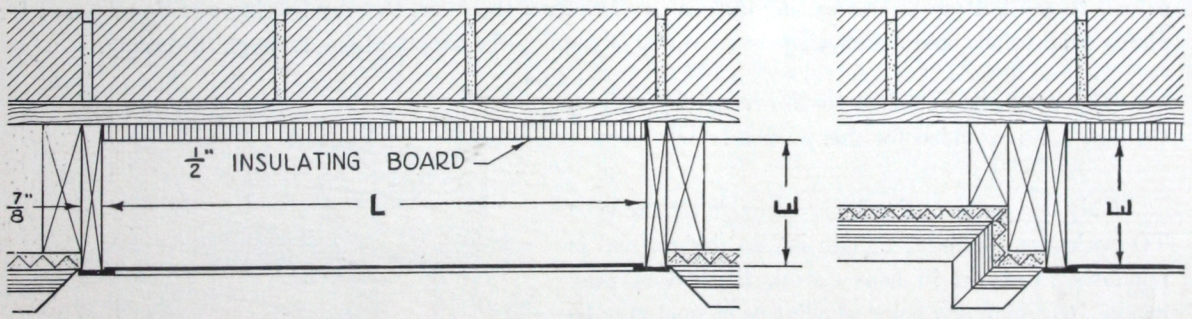
The panel is finished in a neutral shade of gray enamel to which any color of paint or enamel may be applied. It is customary to paint the panels after they are installed in order that the finish will harmonize with other room decoration.

INSTALLATION DIMENSIONS OF METAL PANEL ENCLOSURE

TYPE MP



ELEVATION SECTION



PLAN OF FLUSH RECESS PART PLAN FURRED RECESS

Dimension "L" is the nominal radiator length and is also the length of the recess. The length of the heating element is ½ inch less than the nominal radiator length in all cases.

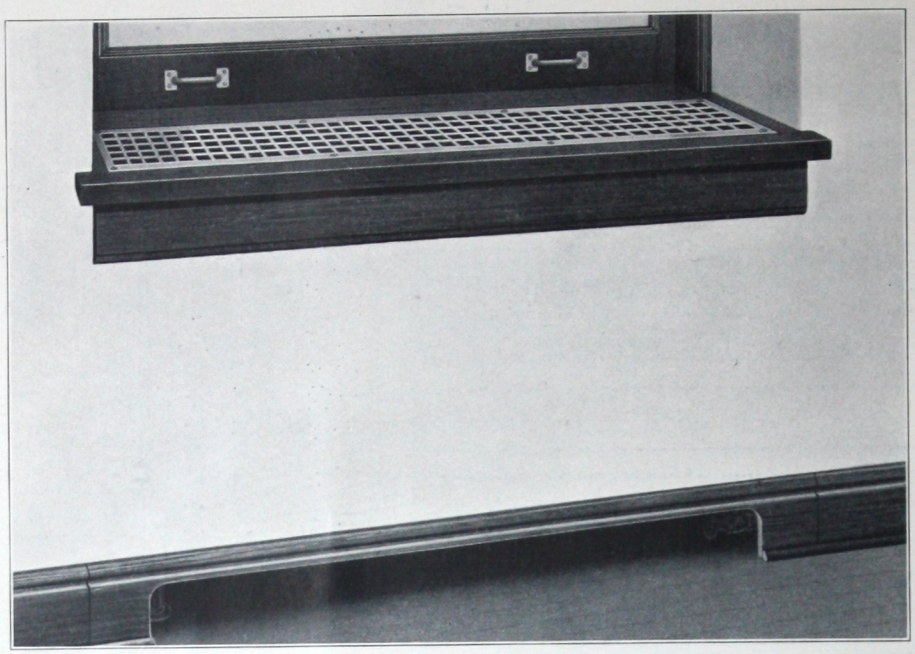
Dimension "E," the recess depth, measured from face of plaster to face of insulation, is 3⅝ inches for the "A" width, 5⅝ inches for the "B" width, 7⅝ inches for the "C" width and 10⅞ inches for the "D" width. Metal panels are available in the following heights only.

The relation between stack height and panel height exists only when the heating element is located 5½ inches from the finished floor — which is standard.

Stack Heights — Stock Panels	12	14	16	18	20	22	24	26	28	30
Corresponding Panel Heights	18⅛	20⅛	22⅛	24⅛	26⅛	28⅛	30⅛	32⅛	34⅛	36⅛
Corresponding Recess Heights	17½	19½	21½	23½	25½	27½	29½	31½	33½	35½

Dimensions in above table are in inches. Recess dimensions must be accurately followed.

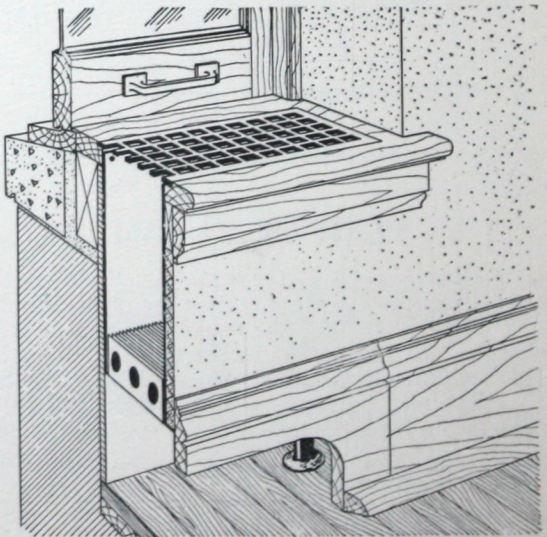
THE TOP OUTLET ENCLOSURE
TYPE TO



IN rooms where the window reveal is deep enough, the type TO enclosure can be used. The arrangement of the type TO enclosure provides for an air outlet through a grille in the window sill.

The casing is made of heavy sheet steel finished inside and out in durable enamel. It is designed to extend to the bottom of the heating element, rather than the floor, thereby leaving additional space for piping connections, and eliminating the necessity of running the supply piping through the casing.

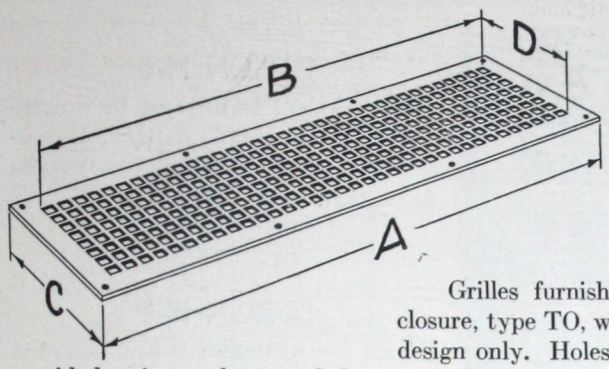
The casing is attached to the recess by nailing through holes provided for this purpose.



Only one pattern of grille is available for the type TO enclosure. This is a plain lattice design, and is regularly furnished in heavy steel, finished in gray enamel, to which any color of paint or enamel may be applied. This grille is also available in brass on special order.

Radiator capacities with top outlet enclosures are given in the capacity tables under the heading "With Top Outlet Grille." The capacities given are those available with window sill outlet grille and allow for the resistance to the flow of air through the radiator enclosure caused by downdraft from the window.

DIMENSIONS AND INSTALLATION NOTES FOR TOP OUTLET ENCLOSURE TYPE TO GRILLES



Radiator Width	C	D
"A" Width	5 1/4	3 1/4
"B" Width	7 5/16	5 5/16
"C" Width	9 3/8	7 3/8
"D" Width	12 13/16	10 13/16

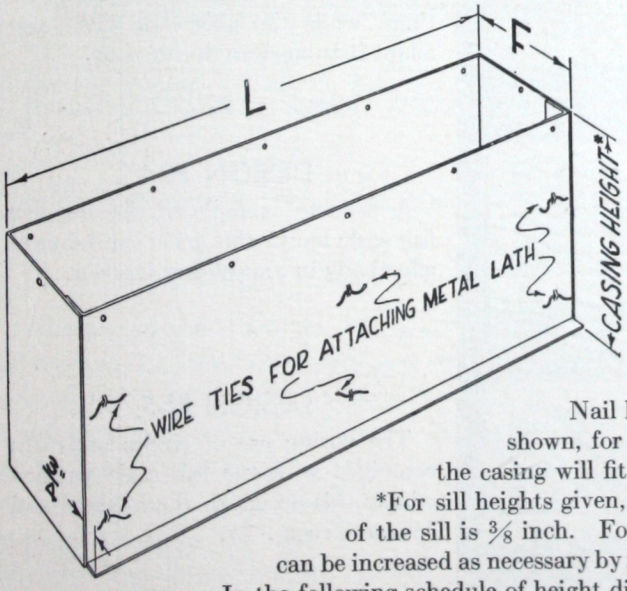
Nominal Radiator Length	A	B
18	19 11/16	17 11/16
24	25 7/8	23 7/8
30	31 3/8	29 3/8
36	37 9/16	35 9/16
42	43 3/4	41 3/4
48	49 15/16	47 15/16
54	55 7/16	53 7/16
60	61 5/8	59 5/8

Grilles furnished with top outlet enclosure, type TO, will be of the plain lattice design only. Holes of 1/4 inch diameter are provided at intervals around the margin for screwing to the sill, which must be recessed so that the grille will lie flush with the top of the sill.

REMOVABLE BASEBOARD SECTION

The length of the removable baseboard section for the type TO enclosure will be L + 2 inches. The length of the air inlet opening in the baseboard will be L − 3 inches, and the height of the opening will be 4 inches.

CASINGS



Dimension "L" is the nominal radiator length, and also the casing length. The length of the heating element is 1/2 inch less than the nominal radiator length in all cases.

The recess length is L + 1/2 inch.

Dimension "F" is 3 9/16 inches for the "A" width, 5 9/16 inches for the "B" width, 7 9/16 inches for the "C" width, and 10 13/16 inches for the "D" width.

The recess depth is "F" + 1/16 inch.

The stack height for the type TO radiator enclosure is measured from the top of the sill to the bottom of the heating element.

Nail holes are provided around the top of the casing as shown, for nailing to the sill, which must be cut out so that the casing will fit perfectly.

*For sill heights given, the distance from the top of the casing to the top of the sill is 3/8 inch. For intermediate sill heights, this 3/8-inch dimension can be increased as necessary by nailing the casing to the blocking instead of the sill.

In the following schedule of height dimensions, it is assumed that the heating element and the bottom of the casing are 5 1/2 inches from the finished floor — which is standard.

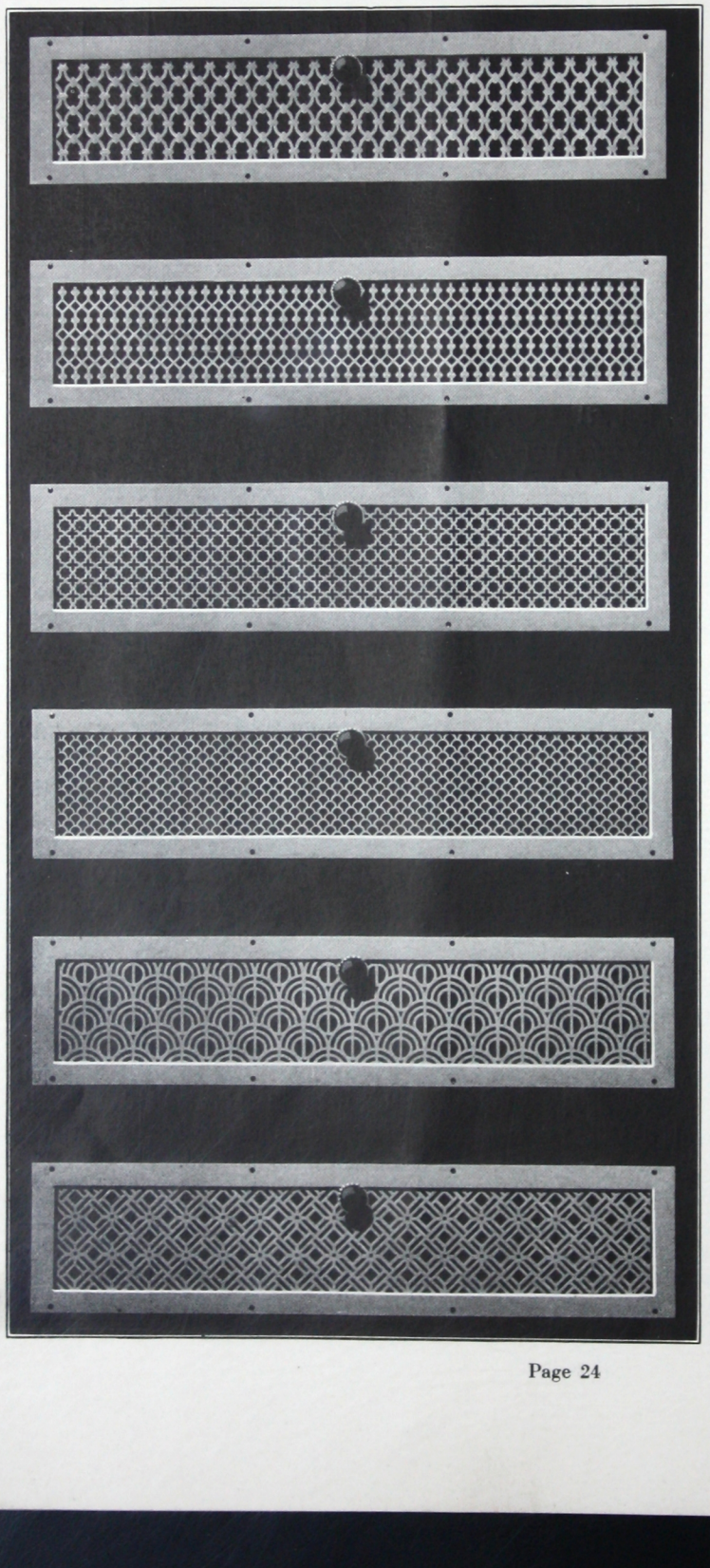
Stock casings are listed. Higher casings are available on special order.

Stack Heights of Stock Casings	8	10	12	14	16	18	20	22	24	26	28	30
*Corresponding Sill Heights	13 1/2	15 1/2	17 1/2	19 1/2	21 1/2	23 1/2	25 1/2	27 1/2	29 1/2	31 1/2	33 1/2	35 1/2
Corresponding Casing Heights	7 5/8	9 5/8	11 5/8	13 5/8	15 5/8	17 5/8	19 5/8	21 5/8	23 5/8	25 5/8	27 5/8	29 5/8

All dimensions given in inches.

GRILLES

The illustrations below show the selection of grille patterns available to the users of Dunham Concealed Radiation, either in the standard grille frame for RC or PF enclosures, or in the MP panel enclosure. The designs are perforated in heavy sheet steel which is electrically welded to a solid, highly finished, bar frame, forming a substantial, yet decorative, panel. The border of the outlet grille is lined with the finest quality felt to eliminate any possibility of air leakage.



DESIGN H-1

This design, because of its rugged character and simple pattern, harmonizes completely with almost any room decoration.

DESIGN H-2

This formal design is best adapted to Georgian or French rooms, though it assuredly qualifies for Gothic interiors as well.

DESIGN H-3

The Moorish tendency of this design will be found suitable for Spanish settings, while the geometric lines also adapt it to modern decorations.

DESIGN H-4

A delicate example of the popular fish scale motif, this grille can be used effectively in almost any interior.

DESIGN H-5

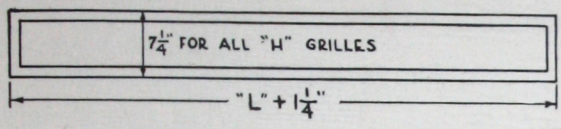
The daring use of circles and arcs combined with the fish scale pattern adapts this design to the modern and Moderne room.

DESIGN H-6

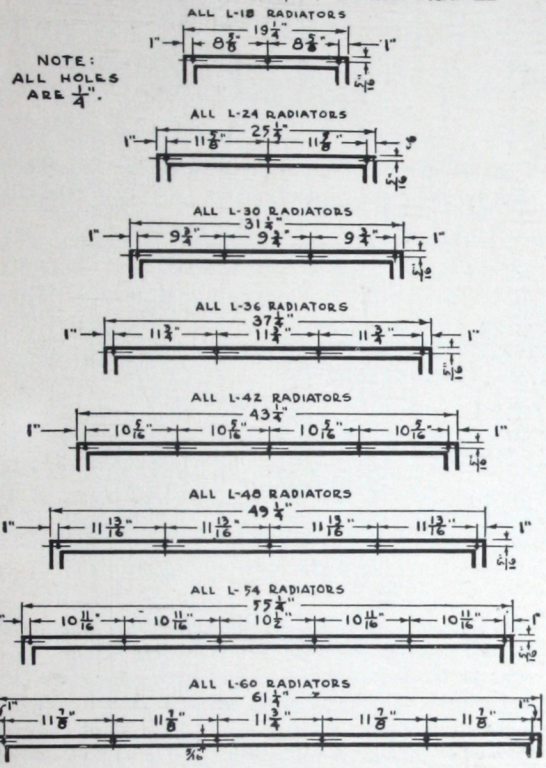
In this pattern is embodied the unequal geometrics of the Ultra Modern, and yet, for all its striking angles, this grille may be used effectively and unobstrusively in rooms of almost any period.

GRILLES

"H" GRILLE DIMENSIONS



LOCATION OF HOLES IN GRILLE FRAMES



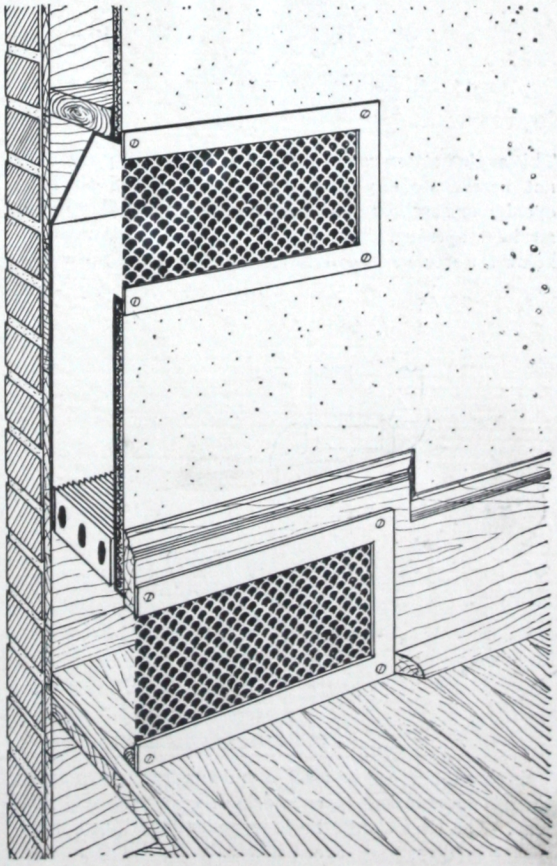
AIR INLET GRILLES

Where it is desired to use an air inlet grille instead of the cut-out removable baseboard section, the standard "H" grille may be attached to the baseboard by wood screws, as indicated in the drawing at the right. If the baseboard is too low to receive the grille, it should be built up as indicated, and the cut-out should be the same height as the grille opening, while the length should equal or slightly exceed Dimension "L." It will not be necessary to have the baseboard section removable as the radiator and accessories will be accessible when the grille is removed. While the RC enclosure is illustrated, the PF, MP and TO enclosures can also be adapted to this installation.

DAMPERS

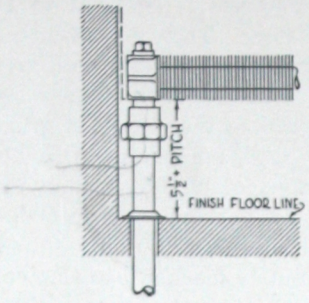
The use of dampers is optional in Dunham Concealed Radiators. They are strongly recommended as an instantaneous and positive method of controlling the heat supply to a room. The damper is attached to the air outlet grille and is operated by a small, unobtrusive Bakelite knob, which is the only part of the assembly extending out into the room. The damper is opened or closed by the action of a brass worm on a geared sector, both parts accurately machined to eliminate chattering or jumping. The sector is in positive engagement at all times.

We recommend a damper for heat control, even though a radiator valve is also provided. The radiator valve makes it possible to completely shut off the supply of steam, but the damper control mechanism is a more rapid and convenient method of controlling the heat supply.

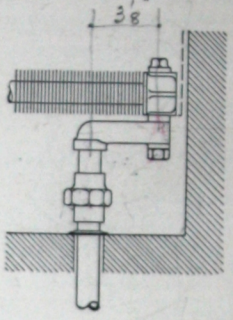


PIPING DETAILS

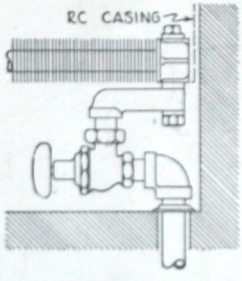
STEAM SUPPLY CONNECTIONS



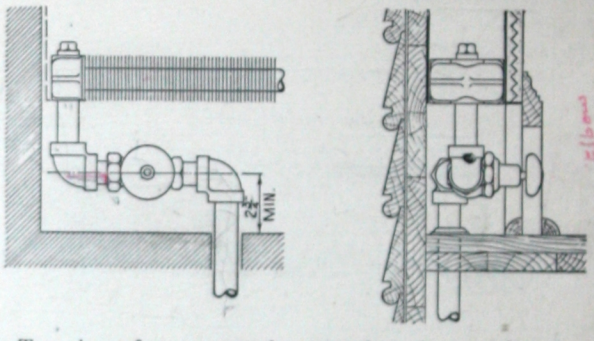
The steam supply pipe can be brought up directly under the tapping in the heating element, when a valve is not used.



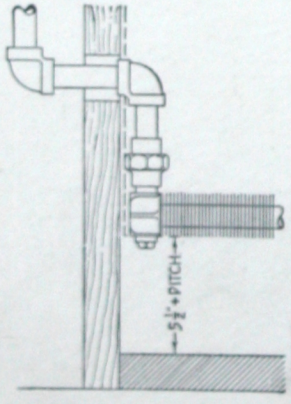
This detail shows the steam supply pipe brought up directly under the tapping in the adjustable regulating fitting.



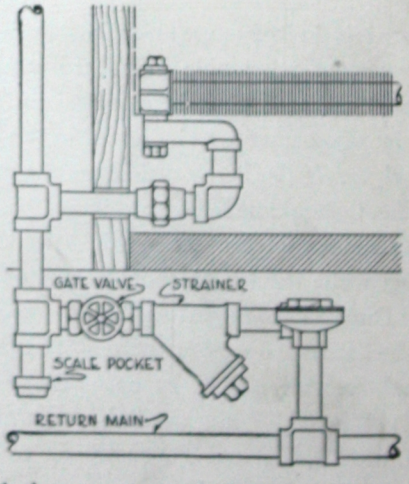
This angle pattern radiator valve works in easily and does not necessitate any special treatment of the air inlet opening or baseboard. The valve is accessible through the air inlet opening. The supply pipe can be brought up below the recess as shown or through the end of the recess.



Two views of a steam supply connection using straightway pattern radiator valve without regulating fitting. Valve must be located at the specified distance from the floor and bonnet must be removed when valve is installed in order to provide clearance above floor when valve is screwed on piping. A valve with union at each end makes this clearance unnecessary.



This connection can be used on a down-feed system when there is not sufficient space to drip riser through a separate trap. The riser should be independently dripped whenever possible.



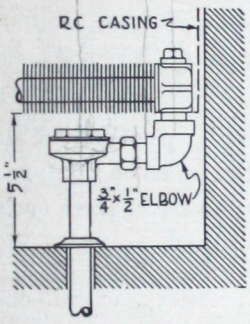
This is the proper connection to a down-feed system.

PIPING DETAILS

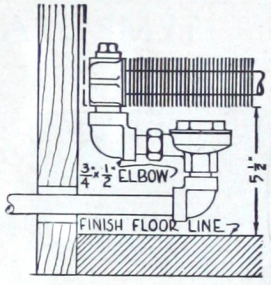
NOTES ON PIPING

1. The drawings on these pages are details — not diagrams. All connections shown can be made in the space which is available.
2. The steam supply or return connection can be made at either end of the heating element, but must be made at opposite ends.
3. The supply connection can be made to either the top or bottom tapping, but the bottom tapping is preferred because the piping is accessible through the air inlet opening.
4. The heating element must always be pitched toward the return end approximately $\frac{1}{8}$ inch for each foot of radiator length.
5. Care must be exercised in making up the nipple or fitting into the return connection. This should not extend more than $\frac{3}{8}$ inch into the return header.
6. Supply and return branches must be sized in accordance with the published tables for the particular system of steam circulation which is to be used. When the size of the supply branch is reduced before entering the heating element, the reduction must be made as near the heating element as possible.

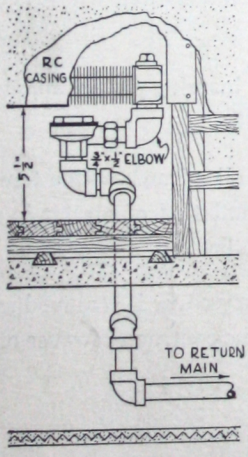
RETURN CONNECTIONS

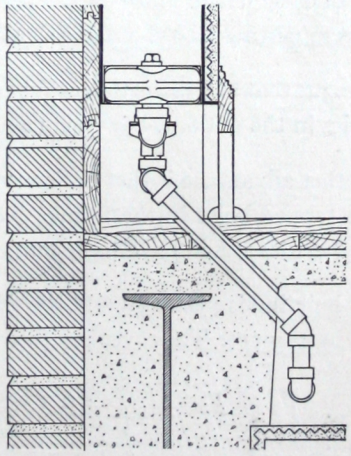


Return connection through standard angle pattern trap with return stub passing through floor immediately below trap outlet.



Return connection with return pipe passing through end of radiator recess.





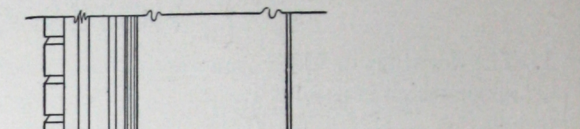
Two views of a return connection with return pipe connecting to branch return main between floor and ceiling construction.

WINDOW SEAT INSTALLATION

RADIATORS of considerable width can usually be used for window seat installation. Where widths are required in excess of the width available in one radiator, two or more heating elements can be connected as one unit.

Metal radiator enclosures are usually unnecessary for this type of installation. Enclosures and grilles for this installation are special, and should be designed to fit the conditions encountered in each instance.

When two or more heating elements are connected together, the total capacity is usually less than the combined capacity for a given stack height because of the resistance of the restricted air intake. Consult the Engineering Department for advice in this connection.



TEMPORARY OUTLET COLLAR COVER

THE temporary outlet collar cover is a piece of sheet metal cut to the exact size of the warm air outlet frame on the type RC and type PF enclosure. It is not supplied as a part of these enclosures, but is furnished at additional cost when ordered.

This cover is a very desirable accessory, and will effect savings in labor which more than offset its cost.

When included with the radiator order, the cover will be attached to the outlet collar frame at the factory. It should be left in place on the casing when the radiator is installed and will prevent plaster or other debris from getting into the radiator recess.

It will also prevent any distortion of the outlet collar frame, thereby insuring perfect alignment between the tapped holes in the outlet collar frame and the screw holes in the grille.

A still further advantage is that the cover is attached to the outlet collar frame with a temporary screw in each of the tapped holes in the frame. This will prevent any accumulation of plaster in these tapped holes, which otherwise would have to be removed before the grille is installed.

After the building is plastered and the trim is applied, the temporary cover is removed and the outlet grille installed in its place. The cover can then be scrapped or stored by the contractor for use on future jobs.

SUGGESTED SPECIFICATIONS FOR DUNHAM CONCEALED RADIATORS

THE heating contractor shall furnish and install where shown on plans Dunham Concealed Radiators of the exact size and type as indicated on the plans and in the schedule.

Heating elements are to consist of straight seamless drawn copper tubes streamlined in shape, with copper fins pressed over the tubes and completely coated with solder to form an integral unit. The tubes are to be pressed into heavy copper sheets and brazed. The header sheets are to be rolled over and brazed to a one-piece bronze casting, forming the covers. Each element shall be tested at the factory after assembly under a minimum of one hundred pounds per square inch hydrostatic pressure, and shall be tight under this condition.

Heating elements and enclosures shall be installed in accordance with the details furnished by the manufacturer, and as shown on the plans. Where protective covers are specified, they are to be left in place until the building is plastered and the trim applied.

Proper recesses will be provided by the general contractor but it shall be the duty of the heating contractor to furnish him with the necessary information regarding size and location of all openings.

Enclosures shall be of the manufacturer's standard design. Types and dimensions are to be as listed in the schedule.

Grilles are to be of the design shown on the schedule, and are to be furnished with or without dampers as indicated. Where dampers are specified, they are to be of one-piece sheet steel, attached to the outlet grille, and operated by a mechanism entirely behind the grille face except for the Bakelite operating knob. The damper mechanism is to be carefully machined and assembled so as to eliminate chattering during operation, and is to remain in any position to which the damper is set.

Every radiator shall be equipped with the Dunham adjustable regulating fitting. Regulating fittings must be installed with the adjusting screw in the full open position. After the piping system has been thoroughly flushed out, the regulating fitting shall be adjusted as required for the radiator on which the fitting is installed.

TYPICAL SCHEDULE OF DUNHAM CONCEALED RADIATORS

J. J. SMITH RESIDENCE

1463 Chester Street, Denver, Colorado

RALPH H. JONES, Architect

Floor	Room	No. of Radiators	Sq. Ft. Each Radiator	Heating Element	Enclosure				Regulating Fitting	Outlet Grille		Inlet Grille	Hooks and Springs ‡
					Type	Stack Height	Collars *	Cover †		Design	Damper		
1	Dining	1	38.9	L-36-B	R.C.	22	Std.	Yes	Yes	H1	Yes	No	Yes
1	Dining	1	46.1	L-42-B	R.C.	22	Std.	Yes	Yes	H1	Yes	No	Yes
1	Living	2	48.1	L-42-B	R.C.	26	Std.	Yes	Yes	H5	Yes	H5	No
2	Bath	1	18.9	L-24-A	P.F.	30	1½"	Yes	Yes	H6	Yes	No	Yes
2	Bed 1	1	49.6	L-36-C	M.P.	24	. .	. .	Yes	H2	Yes	No	. .

*Refers to depth of air outlet collar.
†Refers to temporary outlet collar cover.
‡Refers to hooks and springs for removable baseboard section.

WEIGHTS AND SHIPPING INFORMATION

THERE are literally thousands of possible combinations of heating elements, enclosures and accessories for Dunham Concealed Radiators. To tabulate weights for every possible combination would necessitate tables entirely too involved for ordinary use. The shipping weight of a complete radiator, including heating element, enclosure, grille and damper, varies from about one pound per square foot of rated capacity for the larger sizes to about four pounds for the smaller sizes. For estimating transportation charges, we suggest a figure of about two and one-half pounds per square foot of rated capacity.

All concealed radiators are shipped from our plant at Toronto.

Heating elements are always shipped in separate cartons, which also contain the radiator legs and the two plugs for the extra radiator tappings.

Grilles, enclosures and accessories are carefully packed in the assembly best suited for a specific order.

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